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| 10/588,791 | 05/07/2007 | Mitsuru Suzuki | 065933-0294 | 2617 |

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MCDERMOTT WILL & EMERY LLP
600 13TH STREET, N.W.
WASHINGTON, DC 20005-3096

| EXAMINER | |
|---|---|
| KIM, HEE-YONG | |
| ART UNIT | PAPER NUMBER |
| 2482 | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/588,791 | SUZUKI ET AL. | |
| | Examiner | Art Unit | |
| | HEE-YONG KIM | 2482 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *26 November 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *2-4 and 6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4 and 6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

**DETAILED ACTION**

***Response to Amendment***

1. This office action is in reply to Applicant's Response (**RCE**) dated Nov. 26, 2010.

2. **Claims 2-4** have been amended.

3. **Claim 5 have been cancelled.**

4. **Claims 2-4, and 6** are still pending.

***Response to Arguments***

5. Applicant's arguments with respect to **claims 2-4 and 6** have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 2-3, 5-6** are rejected as being unpatentable over Watkins (US 6,507,672) in view of Horowitz (IEEE Trans. on Circuit and System for Vide Technology, vol.13, 2003, pp704-716), and further in view of official notice, hereafter referenced as Watkins and Horowitz respectively.

Regarding **claim 2**, in the same field of endeavor, Watkins discloses Video Encoder for Digital Video Displays. Watkins specifically discloses An image coding

apparatus comprising: a coding circuit (Fig.4 Multimedia Encoder) which codes (encode, col.1, line 32) an image signal (a frame, col.1, line 32) to be coded, by using intra-frame coding scheme (Intra frame, col.2, line 27-43) and/or inter-frame coding scheme (Predicted Frame and Bi-directional frame, col.2, line 27-43); and said coding circuit codes the image signal by using a scheme complying with MPEG (MPEG, ocl.2, line 3-19), in the reference mode that uses a bidirectional coding (bi-directionally interpolated frame, col.2, line 29), the coding is performed using I pictures, P pictures and B pictures (I or P frame or B frame, col.4, line 39-41)

However Watkins fails to disclose a reference mode selection circuit which sets selectively either a reference mode that uses a bidirectional coding in which a past frame and a future frame are referred to or a reference mode that does not use the bidirectional coding, as the inter-frame coding scheme, according to a table associating a first resolution of an image with one of the reference modes and a second resolution of an image with the other reference mode, the table varying based on an coding execution environment in said apparatus, the second resolution being higher than the first resolution,

wherein said reference mode selection circuit obtains image resolution information, and referring to the table, sets the reference mode that uses the bidirectional coding when an image represented by the image signal to be coded has the first resolution, and sets the reference mode that does not use the bidirectional coding when the image represented by the image signal to be coded has the second resolution,

in the reference mode that does not use the bidirectional coding, I pictures and P pictures are used.

In the analogous field of endeavor, Horowitz discloses H.264/AVC Baseline Profile Decoder Complexity Analysis. Horowitz specifically discloses choosing reference model (Baseline encoder, pp.708, left col., line 12-27) that does not use bidirectional coding mode (I- and P-pictures only, pp.708, left col., line 12-27), in order to meet real time encoding based on encoder and decoder time complexity (left col., line 12-27). And it was well known in the art that high resolution picture video requires more computation compared to low resolution video. Watkins discloses the first reference mode which uses bidirectional mode including I, P, and B pictures. And Horowitz teaches switching to the second reference mode which does not use bidirectional mode ( I and P pictures only), in order to meet real time encoding based on encoder and decoder complexity.

Therefore, given this teaching, it would have been obvious to one skilled in the art to modify Watkins by specifically providing a reference mode selection circuit which obtains image resolution and based on resolution sets the low resolution video to the first reference mode which uses bidirectional mode including I, P, and B pictures, and set the high resolution video to the second reference mode which does not use bidirectional mode ( I and P pictures only) based on the table which maps low and high resolution pictures to the first and second reference mode accordingly, in order to meet real time encoding based on encoder and decoder complexity. The Watkins Multimedia Encoder, incorporating the Horowitz reference mode which does not use bidirectional

mode ( I and P pictures only), incorporating reference mode selection circuit which obtains image resolution and based on resolution sets the low resolution video to the first reference mode which uses bidirectional mode including I, P, and B pictures, and set the high resolution video to the second reference mode which does not use bidirectional mode ( I and P pictures only) based on the table which maps low and high resolution pictures to the first and second reference mode accordingly, has all the features of claim 2.

Regarding **claim 3**, the claim is same as claim 2 except that selection of reference mode is based on frame rate instead of image resolution.

Watkins discloses the first reference mode which uses bidirectional mode including I, P, and B pictures. And Horowitz teaches switching to the second reference mode which does not use bidirectional mode ( I and P pictures only), in order to meet real time encoding based on encoder and decoder complexity.

It was well known in the art that Bi-directional coding is more efficient compression than P-frame (forward only) coding with sacrifice of computation. Therefore, it was obvious that the high frame rate video is encoded using the reference mode which uses bidirectional mode in order to do more efficient video compression to maintain the target bit rate. And also it was obvious that low frame rate video is encoded using the reference mode which doe not uses bidirectional mode in order to be compatible to low complexity decoder which decode only I and P frames.

Therefore, given this teaching, it would have been obvious to one skilled in the art to modify Watkins by specifically providing a reference mode selection circuit which

obtains frame rate and based on the frame rate sets the high frame video to the first reference mode which uses bidirectional mode including I, P, and B pictures, and set the low frame rate video to the second reference mode which does not use bidirectional mode ( I and P pictures only) based on the table which maps low and high frame rate to the first and second reference mode accordingly, in order to do more efficient video compression to maintain the target bit rate for the high frame video and in order for the compressed low frame rate to be compatible to low complexity decoder which decode only I and P frames. The Watkins Multimedia Encoder, incorporating the Horowitz reference mode which does not use bidirectional mode ( I and P pictures only), incorporating a reference mode selection circuit which obtains frame rate and based on the frame rate sets the high frame video to the first reference mode which uses bidirectional mode including I, P, and B pictures, and set the low frame rate video to the second reference mode which does not use bidirectional mode ( I and P pictures only) based on the table which maps low and high frame rate to the first and second reference mode accordingly, has all the features of claim 3.

Regarding **claim 4**, the claim is same as claim 2 except that selection of reference mode is based on bit rate instead of image resolution.

Watkins discloses the first reference mode which uses bidirectional mode including I, P, and B pictures. And Horowitz teaches switching to the second reference mode which does not use bidirectional mode ( I and P pictures only), in order to meet real time encoding based on encoder and decoder complexity.

It was well known in the art that Bi-directional coding is more efficient compression than P-frame (forward only) coding with sacrifice of computation. Therefore, it was obvious that the low target bit rate video is encoded using the reference mode which uses bidirectional mode in order to do more efficient video compression to reduce the bit rate. And also it was obvious that high target bit rate video is encoded using the reference mode which doe not uses bidirectional mode in order to be compatible to low complexity decoder which decode only I and P frames.

Therefore, given this teaching, it would have been obvious to one skilled in the art to modify Watkins by specifically providing a reference mode selection circuit which obtains the target bit rate and based on the target bit rate sets the low target bitrate video to the first reference mode which uses bidirectional mode including I, P, and B pictures, and set the high bitrate video to the second reference mode which does not use bidirectional mode ( I and P pictures only) based on the table which maps low and high frame rate to the first and second reference mode accordingly, in order to do more efficient video compression to reduce bit rate for the low target bitrate video and in order for the compressed high bitrate video to be compatible to low complexity decoder which decode only I and P frames. The Watkins Multimedia Encoder, incorporating the Horowitz reference mode which does not use bidirectional mode ( I and P pictures only), incorporating a reference mode selection circuit which obtains bitrate and based on the bitrate sets the low target bitrate video to the first reference mode which uses bidirectional mode including I, P, and B pictures, and set the high target bitrate video to the second reference mode which does not use bidirectional mode ( I and P pictures

only) based on the table which maps low and high target bitrate to the first and second reference mode accordingly, has all the features of claim 4.

Regarding **claim 6**, Watkins and Horowitz disclose everything claimed as applied above (see claim 2). Watkins further discloses An image pickup apparatus (Video Buffer 414 and RISC CPU 410, Fig.4), comprising:

an image input unit (Video Buffer 414, Fig.4) which takes an image of an object and acquires an image signal (Digital Video, Fig.4);

an image coding apparatus (Fig.4 Multimedia Encoder) according to Claim 2, which codes the image signal (encode a frame, col.1, line 32); and a data storage unit (Bitstream Buffer 416, Fig.4) which stores coded data (bitstream) generated by the coding.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/HEE-YONG KIM/
Examiner, Art Unit 2482

/Marsha D. Banks-Harold/
Supervisory Patent Examiner, Art Unit 2482